Illustration for proposed Janpath streetscape

BHUBANESWAR
URBAN
LECTURES

SMART MOBILITY
SOLUTIONS IN BHUBANESWAR

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smart city
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Executive Summary

The Bhubaneswar urban lecture series workshop titled **"Smart Mobility Solutions in Bhubaneswar"** was organized on February 16, 2017, by the Bhubaneswar Development Authority in collaboration with WRI India in Bhubaneswar. This was the first in a series of urban lecture workshops that will be organized every month. With support from Bhubaneswar Urban Knowledge Centre (BUKC), the workshop was one of the several initiatives undertaken to further the goals and objectives of the Bhubaneswar Smart City. The overarching objectives of the workshop were to:

- Learn from global practices, projects, and experiences to develop child friendly mobility infrastructure
- Bring all concerned city authorities to understand coordination and management of city services and development works
- Understand opportunities and barriers for implementation of the smart mobility solutions by consulting stakeholders

The target audience, that was personally invited, included state and city representatives, professional consultants in urban planning, transportation, engineering, research, NGOs and media. Nearly 175 professionals, from diverse backgrounds participated in the workshop.

The day's agenda included both presentation of ground level issues related to Strategic thinking for Urban Mobility Solutions, Strengthening Public Transportation in Bhubaneswar, Implementing Complete Streets in Bhubaneswar and Promoting Public Transportation through Community Outreach as well as description of local experiences and lively discussions between participants and panelists. The interest and relevance of urban mobility solutions, and the need for such workshops was demonstrated by the strong attendance and thoughtful engagement by participants throughout the day.

Some of the key messages highlighted through the presentations, Q&A sessions, and panel discussions included the following:

- The urban lecture series aims at bringing all experts in the field of urban development for enriching and stimulating discussions to achieve more informed decision-making in this sector
- Planning for long-term strategies in urban mobility, requires a think tank that would identify the needs of the users, the implementation agencies, and planning agencies.
- City planning policies and its priorities should be detailed very carefully by involving Education, Enforcement and Engineering sectors
- Value of human life should be prioritised while designing complete streets
- There should always be a "before and after analysis" of the infrastructure, used in facilitating mobility, to understand the gap analysis of the infrastructure. This process should be undertaken by a third party
- The strategic approach for urban mobility is:
  - Mobility with consideration to:
    - Safety for all
    - Accessibility for all
    - Mobility for all
  - Livability and Sustainability
  - Making it smart
- In the journey to become a smart city the heritage value of the city should be dealt with very carefully to preserve and present it in the best way
- For Bhubaneswar to become a smart city the people should be targeted to take ownership, as they did during the proposal preparation
- Three important criteria for prioritizing pedestrians, cyclists and use of public transport are: 1) Political leadership, 2) Technical team who is ready to make things correctly 3) Funding
- Transport is an important aspect for citizens in preparing for smart cities

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- The cost of metro when compared to the cost of bus system explains why growing cities should target bus system as their backbone for transportation
- There has to be a collective vision for transportation so that in the next 2 years Bhubaneswar can have a good public transportation system
- No city in the world has solved traffic problems by increasing the width of the roads
- Three major principles suggested for sustainable mobility are: 1) Avoid, 2) Shift 3) Improve. We need to AVOID use of cars or private vehicles, we need to SHIFT to public transportation and sustainable modes, and we need to IMPROVE the operations and technology of the system
- Major interventions are necessary but it is very important to keep track on how are we performing on sustainable mobility by assessing if public transportation usage or privately owned vehicles are going up or down. This helps to determine as to what a city needs and when
- While planning we should not assume that all users have the similar expectations and perspectives for public transport, as this will result in a failure in public response to the service
- We should understand that urban development is a learning process that should evolve with time
- We have been following different codes such as the IRC Codes, and all these codes have always talked about standards but they have been in piecemeal. The cycle track has its own standards, the footpaths have their own standards and others have their own
- Six qualities of the complete streets suggested are:
  - Continuous unobstructed movement of pedestrians
  - Inclusive streets for all
  - Reduced vehicle speeds
  - Streets as public spaces
  - Active street edge
  - Resource efficiency
- Events such as Patha Utsav should be conducted to support the need of public space on streets and awareness regarding road safety. Such initiatives have their own magic in bringing people together to more comfortable and accessible places
- Planners and policy makers should share different designs with the community, especially with children, so that a holistic plan can be prepared including every stakeholder in the design

1. Introduction

1.1 Project Background

Bhubaneswar employed an extensive citizen engagement process to guide its journey for transformation to a smarter city. Building upon the input received from the citizens, the overall approach focuses on promoting Smart Growth supported by sound economic development principles while simultaneously, directing investment in initiatives that promote sustainability, inclusiveness, and livability by leveraging technology as an enabler.

Based on the citizen feedback received during Round 1 of the engagement initiative, Mobility and Waste Management as Pan-City Smart solutions and Town Centre as a Smart District were selected to create an implementable Strategic Plan.

To move towards a more livable city, Bhubaneswar focused on creating a model of sustainable urbanization based on New Urbanism principles that had the transformative potential to provide citizens with prosperity, safety, and equity. The focus was on transitioning from conventional urban spatial planning to prioritizing of solutions based on the "three-legged" approach adopted from the New Urban Agenda of Habitat III—legal systems, urban planning, and local fiscal systems.

The urban planning system in Bhubaneswar's context is expanded to include Integrated Land Use and Transport Planning, Infrastructure Planning, and Socio-Economic Planning. Accordingly, Bhubaneswar's Strategic Plan is built on 5 strategic pillars—Responsive Governance, Transit Oriented Development, Fiscal Sustainability, Infrastructure, and Socio-Economic Development. These pillars are guided by 10 Strategic Directions, which are the key strategies for the plan. These together provide the foundation for creating a more inclusive, resource-efficient, and technology enabled future for the city.
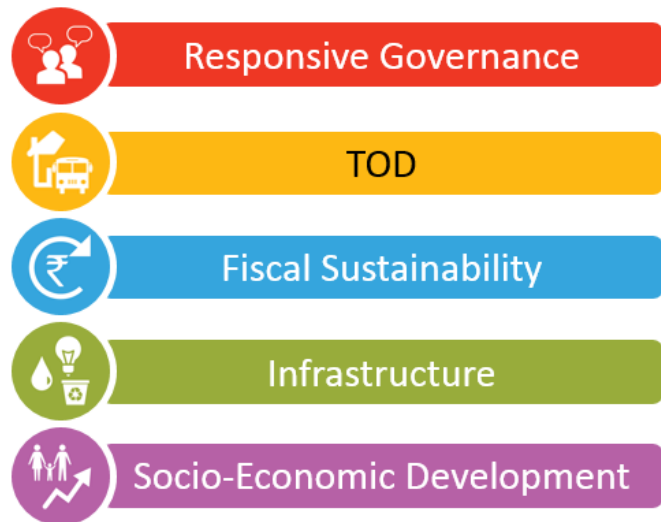

Figure 1: Five strategic pillars for the strategic plan of Bhubaneswar Smart City | Source: BDA

The Build Basics strategy hinges upon recent legal changes such as the CDP Land and Implementation Policy (CLIP), CDP Infrastructure and Development Fund (CIDF), Odisha Housing for All Policy to increase capacities of public institutions to deliver. The focus was on delivering good governance practices through "citizen-centric collaborative decision making". Further, as stated in the financial plan of the Smart City Proposal (SCP), the "strategic plan of Bhubaneswar is based on 'three legged' approach of legal systems, urban planning, and local fiscal systems, adopted from the New Urban Agenda of Habitat III."

Catalyst projects for identified city goals included "Bhubaneswar Urban Knowledge Centre (BUKC)". The BUKC, set up by BDA, will create a state-of-the-art incubator for producing knowledge, ideas and innovation about inclusive and sustainable urban development, and high-quality community design in Bhubaneswar. It is envisaged to be the first point of reference for Bhubaneswar Development Agency (BDA) and Bhubaneswar Municipal Corporation (BMC) for expert knowledge, tailor-made training, and technical support services in urban/regional/metropolitan planning. BUKC seeks to address planning and plan implementation issues that are beyond the mandate of the traditional Master Plans and the current fragmented planning and implementation structure in Bhubaneswar. On the contrary, BUKC is envisioned to build capacities in local agencies effectively integrating across administrative and conceptual boundaries with effective results. Using innovative tools such as road diets, complete streets, place-making, open, web and GIS based data sharing systems. The "five pillars"

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of BUKC are: Child Friendly Smart Cities Centre; Urban Transportation and Complete Streets; Smart Growth Programme; Place-making and Heritage Preservation; Communication and Knowledge Management. A programme management consultant was selected to run BUKC through the Request for Proposals (RFP) process.

Through the "five pillars" of BUKC, the Program Management Consultant (PgMC) is envisioned as a continuous feedback loop for participatory evidence-based planning. The intent is to produce dynamic solutions that are tailored to fit real problems, address needs of different sectors, and produce growth that is inclusive and sustainable.

Figure 2: Illustration showing five domains of Bhubaneswar Urban Knowledge Centre (BUKC) | Source: BUKC

As per the activity 4 of task 2 of the Terms of Reference (TOR) of BUKC, an urban lecture series has to be started by the PgMC to disseminate knowledge of problems faced by different sectors.

Bhubaneswar as one of the first planned cities of modern India has a grid network in place with wide roads, multiple gardens and parks that shape the urban environment of the city. However, in Bhubaneswar, conventional planning approaches have focused on private vehicular movement while a large percentage of trips are performed solely by non-motorized transport (NMT) that is walking and cycling (39%) and public transport modes (22%), which include autos and buses. Even though, these numbers are healthy when compared to NMT modal shares in much of the developed world, the disturbing aspect is the trend of increasing motorisation and decline in NMT and public transport travel. Furthermore, traffic problems, degrading environment, road accidents, and encroachments are manifestations of conflicts of usage that slowly ruins the development of Bhubaneswar.

BDA in collaboration WRI India and with assistance from BUKC organized the first urban lecture on Smart Mobility Solutions in Bhubaneswar on February 16th, 2016 with nearly 175 participants in attendance. This report presents the proceedings of the dissemination workshop. Detailed presentations and supporting materials distributed to participants at this conference is attached as appendix.

1.2 Purpose of the Workshop

The workshop was designed to provide a forum for city agency staff, professionals, academia and NGOs for encouraging participatory approaches in developing Bhubaneswar as a smart city and bring all the decision-making agencies responsible for development of the city, as well as identifying success stories, shortfalls and potential recommendations for smart mobility solutions. These discussions were facilitated within the context of the following overarching workshop objectives:

- Learn from global practices, projects, and experiences to develop child friendly mobility infrastructure
- Bring all the concerned city authorities to understand coordination and management of city services and development works
- Understand opportunities and barriers for implementation of the smart mobility solutions by consulting stakeholders

Figure 3: Stakeholder participation at the workshop | Source: BUKC

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1.3 Workshop Planning & Participation

BDA collaborated with WRI India and BUKC to design and develop the workshop programme. In addition to disseminating the urban mobility solutions, the workshop aimed at increasing awareness and building capacity of staff of different urban agencies to better articulate the importance of developing context-sensitive solutions to local issues.

The workshop agenda included presentations and supporting panel discussions divided into four major sessions: 1) Inaugural Session, 2) Strengthening public transportation in Bhubaneswar, 3) Implementing complete streets in Bhubaneswar, and 4) Promoting public transportation through community outreach. Appendix A lists the detailed workshop agenda.

The workshop organizing team made extensive outreach efforts to ensure participation from key players representing a diverse range of stakeholders at the governmental sectors. During the pre-workshop planning, special emphasis was also given to ensure participation from all staff from governmental agencies and media. The intent was to ensure that all government staff who are also citizens should understand the different processes involved in strengthening public transportation as well as implementation of complete streets and public transportation.

As a result, the one-day workshop was able to attract more than 175 participants representing all staff from urban agencies and participants from NGOs and media. Appendix B contains the lists of participants.

Figure 4: Diverse range of stakeholders representing government and non-government sectors | Source: BUKC

2. Plenary Session

The workshop's inaugural session featured a welcome address by Shri R. Vineel Krishna, IAS, CEO, Bhubaneswar Smart City Limited (BSCL). The plenary session provided participants with thought-provoking and informative ideas regarding transportation, development, environment, and livability. The following section summarizes the workshop introduction and the keynote speaker's address to the audience.

2.1 Welcome Address

Shri R. Vineel Krishna, IAS, CEO, Bhubaneswar Smart City Limited (BSCL)

Shri R. Vineel Krishna opened the workshop by sharing an overview of the day's agenda along with an introduction to Bhubaneswar Urban Lecture series. He explained that through these lecture series the aim is to bring all experts in the field of urban development for enriching and stimulating discussions to achieve more informed decision-making in this sector. His welcome address focused on the theme of smart mobility solutions. He used the respiratory system of the human body as a metaphor to explain the importance of mobility in developing a vibrant and sustainable city.

Shri Krishna then discussed the existing scenario of mobility in Bhubaneswar and compared it with other similar cities of India. As the city grows the mobility for the city has to grow accordingly. During the smart city proposal preparation, the citizens voted overwhelmingly for mobility as the pan city solution to be taken for Smart city proposal preparation.

Shri Krishna then introduced the four different sessions of the day:

- Session 1: Inaugural session
- Session 2: Strengthening public transportation in Bhubaneswar
- Session 3: Implementing complete streets in Bhubaneswar
- Session 4: Promotion of public transportation through community outreach

Shri Krishna welcomed all experts from different professional backgrounds and also the senior officials from government agencies wishing all of them to have a good, educative workshop.

Figure 5: Welcome address by Shri R. Vineel Krishna, IAS, CEO, Bhubaneswar Smart City Limited (BSCL)| Source: BUKC

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2.2 Inauguration of Workshop

By Shri R. Balakrishnan, IAS, Development Commissioner-cum-Addl Chief Secretary to Govt. of Odisha, Shri R. Vineel Krishna, IAS, CEO, BSCL

The workshop was inaugurated by lighting of the lamp by the plenary session.

Figure 6: Inauguration of the workshop by lighting of the lamp by Shri R. Balakrishnan, IAS, Development Commissioner-cum-Addl Chief Secretary to Govt. of Odisha, Dr. Dario Hidalgo, WRI, Bogota and Shri R. Vineel Krishna, IAS, CEO, BSCL | Source: BUKC

After lighting of the lamp, Shri Bankim Kalra, Project Director, BUKC took over and emphasized that all the works in Bhubaneswar for the next coming years will be done collaboratively including everyone in the process. Shri Kalra explained that mobility is a vast topic, and hence the workshop will focused on the work that is being currently implemented in Bhubaneswar: 1) Public Transportation, and 2) Complete Streets at Janpath.

Shri Kalra then discussed about BUKC, which is housed in BDA as the one technical resource centre for different agencies of city. He explained how one agency, BDA, has initiated a centre for applied research, which is helping all the other urban agencies such as Bhubaneswar Municipal Corporation (BMC), Bhubaneswar-Puri Transport Service Limited (BPTSL) and Bhubaneswar Smart City Limited (BSCL). The concept of BUKC is to start a dialogue with the city officials and city residents to identify the future development of the city. Shri Kalra explained about the "child friendly smart city centre," a key pillar of BUKC, and the need to incorporate a child-friendly layer in the entire spectrum of development in the city.

2.3 Session 1 – Inaugural session

Presented by: Dr. Vijay Kovvali, Associate, IBI Group (Strategic Thinking for Urban Mobility Solutions)

Dr. Vijay Kovvali presented his experience on strategic thinking for urban mobility solutions in India. He focused on defining a long-term strategy for smart mobility planning for Bhubaneswar. If a long-term strategy has to be figured out then what will be our target in Urban Mobility. In India, we still have a lot of pedestrians and cyclists whom we almost always neglect every time we talk about mobility. Instead we only plan for cars. This needs to change when we adopt smart mobility in cities. He quoted car sales figures, which have gone up in last two years, showing that people are moving to cars instead of using public transport.

Dr. Kovvali then talked about Urban Mobility as to what does it mean and what is the exiting scenario of mobility in Bhubaneswar. His session focused on what we need to achieve in terms of urban mobility. The current average speed is around 20 km/hr, which means congestion. But if we are looking at 40 km/hr as the average speed, are we happy with the vehicular growth or do we want to change the "as is" scenario of Bhubaneswar. Answers to such questions depend on what the city wants for its urban mobility. Refer Figure 7 for mode share in Bhubaneswar.
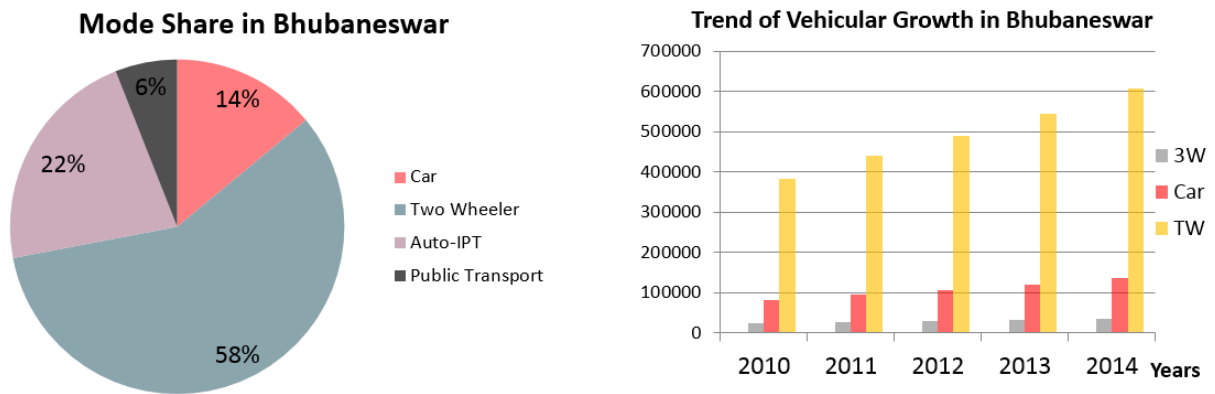

Figure 7: Illustration showing mode share and trend in vehicular growth in Bhubaneswar | Source: Draft ICMP

Dr. Kovvali mentioned different aspects related to mobility, such as increase in vehicular growth, air pollution and value of human life. He emphasised on the benchmarks we want to achieve for our city and our priorities in making mobility sustainable. For a city such as Bhubaneswar what are the different priorities in mobility? For example, is the city walkable? How much parking does it need? And will technology help in improving mobility? Dr. Kovvali presented scenarios to discuss whether the traffic is a problem, or traffic management is a problem, or if we need more infrastructure for mobility.

Dr. Kovvali further explained the priorities of the city. He suggested that the city should be planned around people, for example, a child could easily cross the road at any time of the day. The city and its priority should be thought of very carefully involving Education, Enforcement and Engineering in its planning policies.
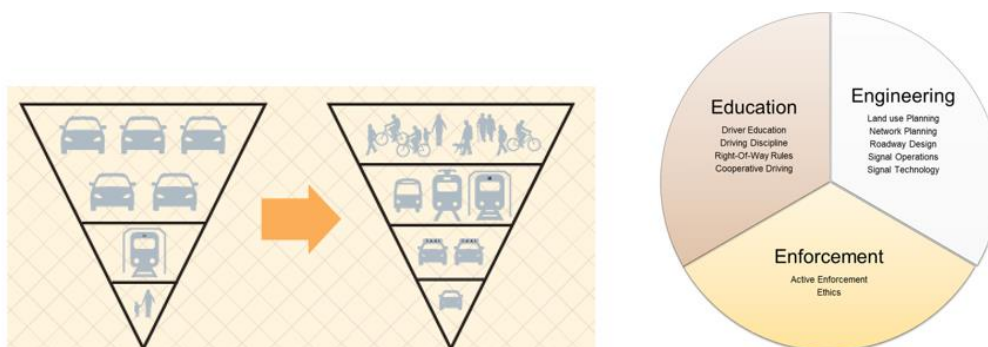

Figure 8: Illustration showing sample of priority of a city by involving three E's in planning policies | Source: BUKC

Dr. Kovvali also suggested the following measures, which can be adopted for improved mobility:

- Traffic police at intersections should prioritize pedestrians and should be educated as to whom they should give priority to while channeling the traffic
- Intersections should be well-designed with proper facilities for all users such as zebra crossing, U-turn, traffic-light cycle etc.
- There should always be a "before and after analysis" of the infrastructure, used in facilitating mobility, to understand the gap analysis of the infrastructure. This process should be undertaken by a third party
- There should be a performance measure of the infrastructure, such as road and intersection usage data and travel time data
- Time delay at the intersections should be monitored and taken care of. An example Dr. Kovvali quoted was bus stops at the intersection. It might seem as a good idea to have a bus stop at the intersection, but this delays the traffic-light cycle and adversely affects greater numbers of people than those using public transport
- Improvement in the potholes through the city is crucial, for they have a huge impact on how a city performs in terms of mobility

Dr. Kovvali concluded his session by presenting the strategic approach for urban mobility, which is as follows:

- Mobility with consideration to:
    - Safety for all
    - Accessibility for all
    - Mobility for all
- Livability and Sustainability
- Making it smart

The strategic approach has to be properly implemented through policy definition, strategic planning, detailing and implementation.

Figure 9: Dr. Vijay Kovvali presenting Strategic Thinking for Urban Mobility Solutions | Source: BUKC

***Keynote Address by Shri R. Balakrishnan**, IAS, Development Commissioner-cum-Addl Chief Secretary to Govt. of Odisha*

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Shri R. Balakrishnan (IAS), took the discussion forward and expressed his regards to Dr. Hidalgo, Transport Expert with World Resource Institute, Bogota, for joining in the workshop. Shri Balakrishnan focused on the historical importance of Bhubaneswar and history of planning in Bhubaneswar. He talked about different historical cities within Bhubaneswar, such as Sisupalgarh, Dhauli and Kalinga Nagri, which have their own importance and a distinct identity. Shri Balakrishnan further added that the planned city Bhubaneswar was the second planned city in India. He also emphasized on the qualities Bhubaneswar possesses to become a smart city. Moving from historical cities to the modern, planned Bhubaneswar, he showed exciting evidence that brought Bhubaneswar on the top of the smart city list. He also elaborated on the restructuring of the city that happened after the cyclone while adding that Bhubaneswar is an inspiration for other cities in the smart city race.

Further, Shri Balakrishnan gave the example of cities, such as San Fransisco, where he had observed the quality of public transport and how the synergy between the mobility and people was carefully managed by the city administration. But the best part, he said, was the ownership of the citizens of the public transport services. People use the facilities and get themselves engaged in the policy decision-making process for better service delivery. For Bhubaneswar to become a smart city, people should be encouraged to take ownership, which they had done during the proposal preparation.

Concluding his remarks, Shri Balakrishnan highlighted that ownership by the people is very important to move ahead in city services such as mobility but also the technical part has to be taken great care of for better functioning. He added that it is not about making Bhubaneswar a smart city as it is about collective ownership by the people. Shri Balakrishnan expressed his regards to the organizing members and the participants for creating such a platform for discussion.

Figure 10: Shri R. Balakrishnan, IAS, Development Commissioner-cum-Addl Chief Secretary to Govt. of Odisha presenting the Keynote address | Source: BUKC

General Address by Dr. Dario Hidalgo, World Resource Institute, Bogota

Dr. Dario Hidalgo in his general address to the participants suggested that leadership is required to deliver and enforce the proposals. He quoted from a Canadian author "If you plan your city around cars, it will fail for   14

everybody including the driver". He emphasised that a general cycle we usually follow is that first we provide space for cars which runs fast, but then more cars come creating congestion, then further it creates pollution, and which further creates accidents, and then we try to solve the problem. Shri Dr. Hidalgo discussed three basic things, which should be kept in mind for prioritizing pedestrians, cyclists and use of public transport: 1) Political leadership, 2) Technical team that is ready to make things correctly 3) Funding. At the end he expressed his warm regards to the participants and to BDA for inviting him to such a great workshop.

Figure 11: Dr. Dario Hidalgo, World Resource Institute, Bogota, addressing the participants | Source: BUKC

2.4 Session 2 – Strengthening Public Transportation in Bhubaneswar

 Address by Dr. Krishan Kumar, IAS, Vice Chairman, Bhubaneswar Development Authority

Dr. Krishan Kumar (IAS) addressed session 2 of the workshop with his experience and views on development of Bhubaneswar as a smart city. He expressed his thanks to the speakers of session 1 who emphasised on making priorities for city to move towards mobility solution implementation. Dr. Kumar backed the opinions of session 1 speakers. Further in the address, Dr. Kumar mentioned the enormous support and polling from Bhubaneswar citizens during the smart city proposal preparation. The polling of the citizens for mobility as a pan city solution led to the organisation of Smart Mobility becoming the pan city solution for Bhubaneswar. The first lecture of the lecture series is therefore on Smart Mobility solutions.

Dr. Kumar pointed out that the 35% of the citizens chose transport as the important issue, which has to be addressed. He also added that most of the other cities also came up with same polling results in which transport became the only priority for citizens in smart cities preparation. He quoted the Bhubaneswar smart city vision to become a "Transit Oriented City (TOD)". Dr. Kumar explained that in the coming future public transportation will become an important backbone for the city. The cities that will provide the best public transport system will be the most competitive cities in India. Bhubaneswar already has the TOD project in place and is the first city to start the work on TOD.

Giving the example of Bangalore and Pune, Dr. Kumar suggested that we need to make Bhubaneswar a similar attractive destination for investment and tourism, which would require state-of-the-art urban transportation system. Quoting the example of London where the bus system carries approximately 45% of the population in-spite of having the best underground metro facility, Dr. Kumar said that the same vision 15

has to be covered for Bhubaneswar so that we can have best bus system to cater to the transportation needs of the citizens and tourists. Comparing the cost of metro with the bus system, Dr. Kumar pointed out that bus system will be the best-suited transportation system for Bhubaneswar.

Talking about the proposed plans, Dr. Kumar mentioned the procurement of 600 buses, which is in pipeline. Concluding the address, Dr. Kumar explained how the Transport Department is linked with every other agency working in the city— PWD, Industries department, Development Authority, Municipal Corporation are all directly connected to Transportation Department. Therefore there has to be a collective vision for transportation so that in next two years Bhubaneswar can have a good public transportation system. Dr. Kumar ended his address by giving his regards to all the participants.

Figure 12: Dr. Krishan Kumar, Vice Chairman, Bhubaneswar Development Authority addressing the participants | Source: BUKC

Sustainable Transportation for Sustainable Cities – A Global Perspective

*Presented by: Dr. Dario Hidalgo, World Resource Institute, Bogota*Dr. Dario Hidalgo appreciated the efforts that were put in by the technical team and the citizens under good leadership, which led the city to win the smart city challenge. He pointed that Bhubaneswar has the capacity to become a smart city as it is also one of the planned cities of India. Elaborating on the definition of a smart city, Dr. Hidalgo brought out the fact that a smart city may not be a sustainable city. Hence we need to plan people- centered cities. Dr. Hidalgo presented a global picture of how cities are planned as being car-centered and thus end up with increased motorization in cities. He talked about the aspirations of people in our current scenario where we feel that we are happy getting a car, and then we are stuck in congestion for hours. The human body was taken as an example in the presentation to show how a city when planned as car-centered ended up with huge problems. When people eat a lot with no exercise, they become obese and the body mass index increases. When the body mass index increases people try to increase the size of their pants but that can never solve the problem of obesity, just as the case of congestion in cities, which cannot be solved by getting more or bigger cars. No city in the world has solved traffic problems by increasing the width of the roads.

Later in the presentation, Dr. Hidalgo suggested some measures for advancing urban sustainable mobility. He suggested three major principles for sustainable mobility: 1) Avoid, 2) Shift 3) Improve. We need to AVOID use

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of cars or private vehicles, we need to SHIFT to public transportation and sustainable, modes and we need to IMPROVE the operations and technology of the system. He emphasized that major interventions are necessary, but it is very important to keep track of how we are performing by monitoring public transportation usage and whether private vehicle ownership numbers are going up or down. Such monitoring measures help to assess as to what a city needs and when. In the earlier presentations and addresses the same point was also raised by different speakers to determine what are the present needs of a city and what will be the requirement in future. This provides a target that can be achieved through better performance. Concluding his presentation, Dr. Hidalgo suggested putting the three major principle—Avoid, Shift, and Improve - in the smart city agenda to make public transport, walking, and bicycling the preferred mobility choices.

Figure 13: Dr. Dario Hidalgo, WRI presenting Sustainable Transportation for Sustainable Cities – A Global Perspective | Source: BUKC

Aggregated Bus Services - Case Study Delhi NCR

Presented by: Shri Laghu Parashar, Transport Expert

Shri Laghu Parashar conveyed in the starting that his presentation is about a startup in the bus service sector in Delhi NCR. He pointed out that the bus has always been the backbone of public transportation in India and abroad. Shri Parashar discussed the evolution of the bus system in India and explained how Indore came up with an innovative solution of the net gross model that was adopted by many other cities for better quality bus service systems. He explained that with all these innovative ideas and solutions, we have become mature in planning bus systems after many failures and successful models.

Shri Parashar explained how he studied different case studies to understand the implementation of aggregator bus service. He shared about the existing conditions of the aggregator bus service, which is running in some parts of Delhi NCR and suggested that this model will be best suited for Bhubaneswar. According to his opinion, while planning we assume that all the users have the same expectations and perspectives about public transport, which results in failure in public response to the service. While discussing about the existing scenario of the public transport, Shri Laghu compared the aggregator bus service facility in terms of affordability, reliability and comfort. Later in his presentation, Shri Laghu explained in detail about the how the aggregator   17

bus service system works for operators, roles and responsibilities of the aggregator, and also how a passenger can use the facility of this type of bus system.

Shri Parashar explained the user preference and the modal shift that can happen, which was studied using a survey floated online. Shri Parashar said that the survey showed positive shifts from other modes to bus aggregator service, however there was no shift from bus service to bus aggregator service. He also showed that approximately 80% of the people interested in shifting own a car or use a car for mobility. It was also discussed that this system is more affordable than other systems in place. A number of other reasons were showcased because of which the users want to shift to the aggregator bus service system.

Concluding his presentation Shri Parashar discussed the regulatory framework behind the service and how many challenges the system faced before coming into action. Several reasons were stated by Shri Parashar for implementing an aggregator bus service, such as first/last mile connectivity, which makes buses a preferred choice, an asset light model leading to low cost operations, an alternative for choice riders which enabled a mode shift from cars, and a high level of user satisfaction.

Figure 14: Shri Laghu Parashar, Transport Expert presenting Aggregated Bus Services - Case Study Delhi NCR | Source: BUKC
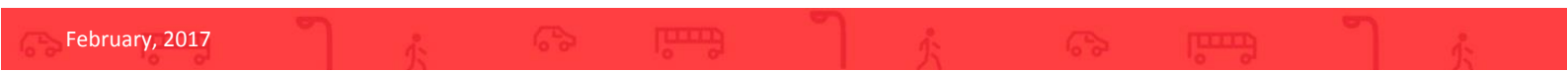
Special Address by Shri. Aditya Prasad Padhi, IAS, Chief Secretary, Govt. of Odisha

Shri Padhi appreciated the presentations made by different experts from different cities and country. Shri Padhi expressed his concern that whenever he is called for any such workshops he always wonders why did we not meet earlier to discuss such issues. Issues which are so concerning for a city should have been discussed decades before. He shared that it has become a very important responsibility for Bhubaneswar to creatively solve such urban problems as Bhubaneswar is declared as the first smart city by MoUD. He was concerned about issues in development of traffic and transportation infrastructure and implementation. Shri Padhi suggested that Bhubaneswar should work towards solving these issues, ahead of other cities. He suggested to move ahead with innovative ideas synthesizing our rich heritage with needed development. Bhubaneswar is a heritage city and the development should reflect it. Marking the importance of bus system Shri Padhi pointed that Bhubaneswar is also a tourist city, which requires good public transportation. The development in the domain of public transportation or in any other domain should be done to attract tourists in the city. Shri Padhi explained that Bhubaneswar is becoming the education hub for the eastern region and also Bhubaneswar is trying to become a city where there is ease of doing business. For all these visionary goals, movement is very important from one place to other. Public transportation will thus play an important part in achieving these goals.

Shri Padhi praised Dr. Hidalgo for his presentation and the latter's suggestion that we cannot improve our public transportation if we keep on increasing the width of the road. He expressed several examples of countries abroad where it is very difficult to use public transportation, and also there are countries which have shown remarkable efforts in public transportation. He suggested adapting the good models, which best fits the city for better mobility solutions and is also scalable.

Figure 15: Special Address by Shri. Aditya Prasad Padhi, IAS, Chief Secretary, Govt. of Odisha | Source: BUKC

Concluding his address, Shri Padhi suggested that a good bus system is crucial for Bhubaneswar. But we need to incentivize it in such a way that people are motivated to shift the mode. Shri Padhi thanked all the participants and experts for giving their time and providing innovative solutions.

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2.4.1   Interactive Session with audience

Question: City environment is never considered in transport planning. How can we take the considering environment into consideration in every planning aspect?

Answer: We need to consider the economics of moving from petrol/diesel to CNG to reduce pollution. It is important to focus on the distance of travel, and then we can decide on type of buses—low emission/hybrid buses—to address pollution.

Figure 16: Interactive session on Strengthening public transportation in Bhubaneswar | Source: BUKC

Question: Different departments may be having different outlooks in dealing with a problem. How do you harmonize interests of different agencies/stakeholders?

Answer: It is very hard to provide for everybody. For mobility-oriented solutions, the city needs to prioritize and then plan accordingly. With political leadership and recommendation from the top level with public participation, it can be achieved through prioritisation.

Question: Why can't we stop operation of old vehicles to reduce pollution?

Answer: As per the Government's guidelines, a 15-year old vehicle can be sent for scrapping. Delhi also has a policy that 10-year old diesel vehicle should be scrapped.

Question: Cab aggregators have gathered and are eating up the share of metro or bus transport modes. Will the bus aggregator compete with transport mode share? In Bogota, what is the solution for such situation?

Answer: These aggregators can be replaced by organised and technologically effective public transport. The technology used in aggregators to make it convenient can be used in public transportation to make it more effective and sustainable.

Answer: We have not been able to provide organised public transport. The bigger vision is to get people to leave their cars and use a shared system.

Question: Are there any plans for metro in the city?

Answer: Bhubaneswar does not yet qualify for the metro system due to its relatively small population size.

Question: Are the road widths sufficient to support the buses?

Answer: Road widths in Bhubaneswar are sufficient for all kind of vehicular modes, especially on the designated bus routes.

Question: We should consider the floating population of Bhubaneswar, which is much higher than the existing population of Bhubaneswar. Keeping this in mind, can we not plan for metro to connect the twin cities and also for intra-city mobility?

Answer: To make Bhubaneswar qualified for metro we need to have enough density. It has to have a good ridership. Quoting an example for viability Vice Chairman (VC), BDA said that the entire population of Bhubaneswar would have to visit Cuttack and come back every day to make it viable. Metro costs approximately 300 – 350 crore per km while a bus system will cost only 10% of it.

2.5 Session 3: Implementing Complete Streets in Bhubaneswar

Presented by: Shri Bankim Kalra, Project Director, BUKC

Shri Bankim Kalra gave the presentation explaining Project URBS (Urban Regeneration through Bhubaneswar Streets), which was identified during the smart city proposal preparation. Shri Kalra discussed about the current status of development and its relation with transport services in various Indian cities. Shri Kalra shared examples from various Indian cities to showcase the problems related to transportation planning. If we look at the current situation, it is very hard to find a place to walk or cycle. He explained that urban development is a learning process, which evolves with time. Bhubaneswar's cycle track was taken as an example, which at one time was a state-of-art cycle track. But, at this point in time, needs re-development. He praised Bhubaneswar as the city that is open to urban development transformations.

Later in his presentation, Shri Kalra explained that a lot of agencies are involved in urban transport. He explained that this is the reason for the lecture series so that different urban agencies can be brought together at one platform. Further, Shri Kalra highlighted that we follow different codes such as the Indian Road Congress (IRC) Codes, and all these codes have always talked about standards but they have been in piecemeal. The cycle track has its own standards, the footpaths have their own standards and so on. Citing the mode share of Bhubaneswar, which shows that 39% are cycling and walking, Shri Kalra highlighted that similar to other cities Bhubaneswar has been following automobile-oriented planning until now. However, with initiatives such as smart cities and sustainable transportation as the priority at the national level, things are progressing in Bhubaneswar to adapt more people centric approach.

Shri Kalra, later in the presentation, explained different projects and initiatives which all help us to think about pedestrians and pedestrianisation very seriously. The Bhubaneswar Town Centre (BTC), TOD Project, the Smart City Proposal and the Raahgiri, all of it together strengthen the idea of pedestrianisation in Bhubaneswar. Moving forward, Shri Kalra discussed different projects such as BTC and TOD and Smart city and how Bhubaneswar got famous after winning the smart city challenge. He appreciated the proposal, which was awarded many international awards for its strategic and progressive thinking. Project URBS (Urban regeneration through Bhubaneswar Streets) was discussed, which was thought during the smart city proposal preparation. Project URBS talks about revamping of road design specifications, implementation of complete streets by allocating equitable space for all users and resource efficient mechanisms such as road diets, no parking zones, mid-block crosswalks every 250 m, shade trees/arcades, differently-abled street design, active retail frontage and utility ducting. Shri Kalra also requested the city officials to review the street design guidelines, which is available with BDA. The following six qualities of complete streets were discussed:

- Continuous unobstructed movement of pedestrians
- Inclusive streets for all
- Reduced vehicle speeds
- Streets as public spaces
- Active street edge
- Resource efficiency

Concluding his presentation, Shri Kalra explained all the six qualities relating it to Bhubaneswar's context and handed over the mike to Shri Sandeep Venkatramu to explain the implementation of these six qualities in Janpath.

Figure 17: Shri Bankim Kalra presenting Urban Regeneration along Bhubaneswar's Streets (URBS) | Source: BUKC

Shri Sandeep Venkatramu took over the stage and continued the presentation. He discussed that Smart Janpath is one the first steps in trying to provide a hands-on session in the city and give a new experience to the users. Shri Venkatramu explained the extent and location of the Janpath and discussed the existing condition of the stretch. Through interesting visuals as shown in Figure 18 Shri Sandeep explained what different users experience while walking of cycling or riding on Janpath. The visuals focused on children as they are most vulnerable on roads.

Figure 18: Illustration showing what different users experience while walking of cycling or riding on Janpath | Source: BUKC

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Shri Venkatramu also highlighted the same points that were by Shri Kalra in his presentation. All the elements of existing design of Janpath is under piecemeal approach which results in a very bad pedestrian and cycling environment. Shri Venkatramu explained how the Janpath Street was studied with respect to land use to give an identity to the street. Studying the existing scenario in great detail the BUKC team came up with a nine-point strategy to convert Janpath into a complete street. The nine-point strategy discussed are:

Figure 19: Illustration showing nine-point strategy for redesigning Janpath as a complete street | Source: BUKC

Figure 20: Shri Sandeep Venkatramu on transforming Janpath into a complete street | Source: BUKC

Shri Venkatramu discussed all the strategies in detail and explained all the elements being incorporated in the design under each strategy. He emphasized on transit priority, context-sensitive design where several knowledge plazas have been identified, sustainable and integrated utilities where bio swales have been

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designed for ground water recharge, integration of child-friendly features and smart features, which will be the most visible technological change in the design.

Concluding his presentation, Shri Venkatramu elaborated on the way forward for the designs. He shared that detailed designs have been prepared and the tender for implementation is also out.

After the presentation Shri Kalra requested all the city officials to kindly give their inputs in the design of Janpath. He insisted that we should put our full efforts in the Janpath design and implementation so that it can become a street for which Bhubaneswar citizens should be proud off. Shri Kalra particularly requested Dr. Hidalgo to kindly give his inputs on the design so that we could learn from the experience of Bogota.

Dr. Dario Hidalgo appreciated the efforts done in Janpath project. He shared his view that safety is one of the important aspects that designers or policy makers should consider while designing transport infrastructure. He suggested referring to *"Cities Safer by Design"* published by WRI which has many elements of good and safer design.

Address by Shri. Y.B. Khurania, IPS, Commissioner of Police, Bhubaneswar-Cuttack Police Commissionerate

Shri Khurania appreciated the efforts, which city development authorities have taken up. Shri Khurania gave his regards to Dr. Kumar and Shri Vineel Krishna and their team for having showcased such a nice dream of redeveloping Janpath into a complete street. Shri Khurania expressed that he hopes this dream will come true in next two years and different issues on Janpath will be dealt to change it to complete street. Shri Khurania discussed the existing situation of cycle tracks and pedestrian pathways in Bhubaneswar. He questioned how many people were actually using them or what is the problem due to which they are not being used. He suggested that the plan should be prepared with every stakeholder on board, which was not happening till now in Bhubaneswar. He once again presented his regards to Dr. Kumar and his team and insisted that as with the smart city challenge, every stakeholder is taken on board for collaborative design preparation and implementation. Shri Khurania insisted that we should have the same dream for the whole city so that overall development is channelized in a better manner. He discussed that we should study Janpath's design and implementation so that it could be implemented at other places also and becomes a role model for others. At the end, Shri Khurania congratulated smart city staff for working with such great enthusiasm.

Figure 21: Shri. Y.B. Khurania, IPS addressing the participants at the workshop | Source: BUKC

2.5.1 Interactive Session with audience

Question: The street vendors encroachment on the road is common in Bhubaneswar and every other city. What is the plan of the authorities to check these encroachments on complete streets?

Answer: In the last two months a lot of street vending encroachments have been checked. There will be planned vending areas and kiosks on Janpath so that they have a dedicated space for vending.

Question: Are there any plans for on-street parking, which is currently occupying a lot of space on Janpath?

Answer: The stretch is a highly commercialized area. In the design there are provisions for regularized on-street parking, and several multi-level car parking projects have been initiated to cater to parking requirements of the area.

Question: Are there any plans for on-street parking which is currently occupying a lot of space on Janpath?

Answer: The stretch is a highly commercialized area. In the design there are provisions for regularized on-street parking and several multi-level car parking projects have been initiated to cater parking requirements of the area.

Figure 22: Interactive session on Implementing Complete Streets in Bhubaneswar | Source: BUKC

Figure 23: Figure 22: Interactive session on Implementing Complete Streets in Bhubaneswar | Source: BUKC

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2.6 Session 4: Promoting Public Transportation through Community Outreach

2.6.1 Experiencing mobility from a child's perspective

Presented by: Master Rupak Gowda, City Child Leader, Humara Bachpan, NGO

Master Rupak Gowda presented his experience in mobility from a child's perspective. He focused on the problems faced by children in their daily commute. If a long-term strategy has to be figured out then what will be our target or what do we want to achieve in urban mobility. He divided mobility in Bhubaneswar mainly into three heads: Public transport, Pedestrian and Traffic. He cited his own experiences while using public transport in Bhubaneswar. He focused on issues in local buses such as low frequency, buses stopping after the bus shelter, and maintenance. The height of steps into a bus are not ergonomically designed for children, which makes it difficult for children to access public transport. He stressed on reservation of special seats for children and pregnant women. He also quoted that bus shelters can be more child-friendly with good seating, proper maps and signage, drinking water facilities and safety railing.

Figure 24: Master Rupak Gowda, City Child Leader, Humara Bachpan, NGO presenting Experiencing mobility from a child's perspective

Master Gowda then talked about pedestrian paths and cycle paths and how they feature in the mobility of Bhubaneswar. He focused the session on how motorcycles are mis-using the existing footpaths and bicycle tracks in Bhubaneswar. He spoke about child friendly traffic intersections in the city. He spoke on how zebra crossings can be made more visible from through art and craft or technological intervention. These signals can be made more secure through CCTV.

Concluding his session, he quoted some of the traffic systems, which were done by volunteers from Humara Bachpan, and stated that further exercises could be conducted with city authorities.

2.6.2 Impact analysis of Patha Utsav in Bhubaneswar

Presented by: Ms. Sarika Panda, WRI India

Ms. Panda started the presentation by taking inputs from the participants. She asked whether the participants want to enjoy their streets or not, and if yes, then what is it that is stopping them to enjoy. Taking the example of Patha Utsav, which happens every Sunday in Bhubaneswar. Patha Utsav is a weekly street event that plans to reduce vulnerability of pedestrians and cyclists on the roads through organising safety awareness campaign, installing temporary street furniture—benches, vendor kiosks, and ensuring safety measures—police kiosks, ambulances and fire brigades, along with a dose of fitness with dance, yoga and cycling. The participation in Patha Utsav by the citizens shows that they want streets as public spaces also. Prior to Path Utsav, the streets were generally designed for smooth plying of motor vehicles. However, after Patha Utsav, people have started demanding safer and segregated bicycle lanes and other necessary pedestrian facilities. The initiative has its own magic of bringing people together to more comfortable and accessible places that it became a huge hit with the footfall at times reaching to 70,000 or even more. It was quoted that Bogota, a city in Columbia, has been organizing cyclovia, a similar event like Patha Utsav since 46 years. And cycle tracks in Bogota have been extended from 3 km of stretch to 130 km.

Ms. Panda showed the success of the event through a survey analysis done by her team from WRI. So far 6 lakh people have visited Patha Utsav, 83% people visit every Sunday and 83% women feel safe in Patha Utsav. The real need of streets as public spaces was demonstrated by these figures. Many other success stories from different cities were also discussed in the presentation.

Figure 25: Ms. Sarika Panda, WRI India presenting Impact analysis of Patha Utsav in Bhubaneswar

Concluding the presentation, Ms. Panda requested all the participants and important officials to kindly visit Patha Utsav and promote cycling and walking in different administrative offices. Different initiatives were also discussed such as TOD, City wide Non-motorised transport (NMT) masterplan, Citywide Public bike sharing scheme (PBS) and Road safety to move forward on this issue.

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Address by Shri B. S. Chayani, Additional Commissioner-cum-Member-Enforcement, Bhubaneswar Development Authority (BDA)

Shri Chayani started his presentation explaining how Patha Utsav has contributed towards road safety. Patha Utsav as an event has shown a way in making a smart city. As it is frequented by 4-year old toddlers to nonagenarians, maintaining proper lanes for cycling, walking and activities were all well thought-out to ensure that citizens have a better understanding of road use and its practical utility. Patha Utsav added a new definition of road safety making different users of the road respect each other's rights for its proper use. It adopted a conventional approach of 5E's—engineering, education, encouragement, enforcement, and evaluation—by adding a new dimension of road safety to it. The Patha Utsav initiative brings together people from across disciplines and provides tangible solutions for safety that form the basis of shared trust for bigger endeavours. The involvement of the citizens and authorities in Patha Utsav has given a kick to several infrastructure projects on road safety and NMT.

Figure 26: Shri B. S. Chayani, Additional Commissioner-cum-Member-Enforcement, Bhubaneswar Development Authority (BDA) addressing the participants on Patha Utsav learnings

Shri Chayani showed that only 1.3% of roads have cycle tracks and only 35% of roads have footpaths. However, if we need to move ahead for planning smart cities, these statistics should go up drastically. Coordination between different agencies and interests of different stakeholders were also discussed to understand the needs of a complete street. Also the lack of practical experience of being a pedestrian or a cyclist among planners and policy makers was highlighted in the presentation. Different messages that are sent through the event to different planners and policy makers were also discussed, such as:

- Street design should be done considering every type of user such as pedestrians, cyclists, vendors, children and senior citizen
- The number of children who visit Patha Utsav shows that children need space on the street. And children should be considered if a city has to become a child-friendly city, which Bhubaneswar is planning for
- Street design should consider the different types of dresses, especially for women, to facilitate movement in crossing a road or walking or cycling

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- Policy makers must visit Patha Utsav to understand the problem faced by different users on the road
- Equitable distribution of road space
- Different urban agencies have to come together and work to make a road to complete street

Concluding the presentation, Shri Chayani requested all to actually walk on the road to make it better and also the urban agencies to let citizens walk on the road to understand the technical and design solutions from making complete streets.

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3. Closing Remarks

By Ms. Dharitri Pattnaik, Country Head, Bernard van Leer Foundation

Ms. Pattnaik gave the closing remarks, and in her address she congratulated all the participants and the organizers for organizing such an event. Ms. Pattnaik also shared that impacts and evaluation are key elements for any project, and in the series of presentations throughout the day, every aspect has been discussed in detail including impacts and evaluation. 40% of the population of Bhubaneswar lives in slum and approximately 80 thousand children lives in these slums. Ms. Pattnaik emphasized that the BDA planners and policy makers should share different designs with the community, especially with children, so that a holistic plan can be prepared including every stakeholder in the design. She quoted Enrique Peñalosa who said that "children are like indicator species, if you design with the perspective of a child, then it's designed for everyone".

Figure 27: Closing remarks by Ms. Dharitri Pattnaik, Country Head, Bernard van Leer Foundation

At the end, she presented her warm regards to Bhubaneswar Development Authority, Bhubaneswar Urban Knowledge Centre team and all the participants for making children as anchors for the workshop, which has changed a dimension of organizing such events.

At the end, Shri Bankim Kalra addressed all the participants by presenting warm regards from BDA and BUKC team. He requested all the participants to be associated with BDA as a lot of more lecture series will be organized by BDA in coming months and years. He also requested the citizens to kindly be a part of the design sessions in workshops as well as be part of every decision that the city will take to move ahead in development. Summing up the day's proceedings he acknowledged the overwhelming response from the audience and assured them that different plans for the city will definitely be shared every time with them for inputs.

Appendix A: Workshop Agenda

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SMART MOBILITY SOLUTIONS IN BHUBANESWAR
AGENDA

Dt: 16-02-2017	Venue: Crystal Hall, Mayfair Lagoon
Time	**Programme**
INAUGURAL SESSION	
10:00 – 11:00	Registration
11:00 – 11:10	**Welcome Address** Shri R. Vineel Krishna, IAS, CEO, Bhubaneswar Smart City Limited
11:10 – 11:15	Ceremonial Lamp Lighting
11:15 – 11:25	**Introductory Remarks** Shri Bankim Kalra, Project Director, Bhubaneswar Urban Knowledge Centre (BUKC)
11:25 – 11:40	**STRATEGIC THINKING FOR URBAN MOBILITY SOLUTIONS** Dr. Vijay Kovvali, Associate, IBI Group
11:40 – 12:00	**Keynote Address** Shri R. Balakrishnan, IAS, Development Commissioner-cum-Add Chief Secretary to Govt. of Odisha
12:00 –12:15	Tea Break
SESSION 2: STRENGTHENING PUBLIC TRANSPORTATION IN BHUBANESWAR	
12:15 – 12:35	**Address** Dr. Krishan Kumar, IAS, Vice Chairman, Bhubaneswar Development Authority
12:35 – 13:00	**SUSTAINABLE TRANSPORTATION FOR SUSTAINABLE CITIES- A GLOBAL PERSPECTIVE** Dr. Dario Hidalgo, World Resources Institute, Bogota
13:00 – 13:15	**AGGREGATED BUS SERVICES - CASE STUDY DELHI NCR** Shri Laghu Parashar, Transport Expert
13:15 – 13:35	**Special Address** Shri Aditya Prasad Padhi, IAS, Chief Secretary, Govt. of Odisha
13:35 – 14:30	Lunch Break
SESSION 3: IMPLEMENTING COMPLETE STREETS IN BHUBANESWAR	
14:30 – 14:45	**URBAN REGENERATION ALONG BHUBANESWAR'S STREETS (URBS)** Shri Bankim Kalra, Senior Urban Planner, IBI Group
14:45 – 15:00	**TRANSFORMING JANPATH INTO A COMPLETE STREET** Shri Sandeep V., Urban Planner, IBI Group
15:00 – 15:15	**Address** Shri D. S. Kutey, IPS, Transport Commissioner-cum-Chairman, STA, Odisha
15:15 – 15:30	**Address** Shri Y.B. Khurania, IPS, Commissioner of Police, Bhubaneswar-Cuttack Police Commissionerate
SESSION 4: PROMOTING PUBLIC TRANSPORTATION THROUGH COMMUNITY OUTREACH	

15:30 – 15:50	**IMPACT ANALYSIS OF PATHA UTSAV IN BHUBANESWAR** Ms. Sarika Panda, WRI India
15:50 – 15:55	**EXPERIENCING MOBILITY FROM A CHILD'S PERSPECTIVE** Shri Rupak Kumar Gouda, Hamara Bachpan
15:55 – 16:10	**Address** Ms. Dharitri Pattnaik, Country Head, Bernard van Leer Foundation
16:10 – 16:25	**Address** Shri B. S. Chayani, Additional Commissioner-cum-Member-Enforcement, Bhubaneswar Development Authority (BDA)
16:25 – 16:40	**Address** Shri Sachin R. Jadhav, IAS, DMA, Director – Housing & ex-officio Joint Secretary

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